

Additive Manufacturing Technology for a 25,000 lbf LOX/Methane Mars Ascent Engine, Phase I

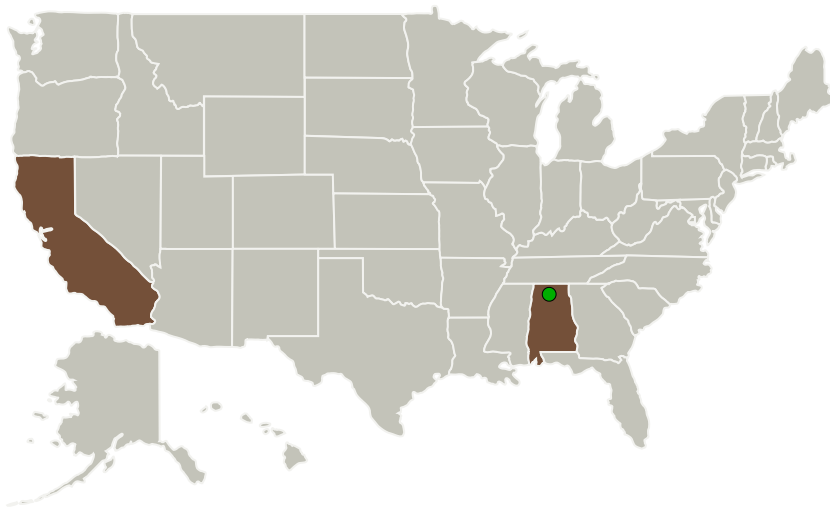
Completed Technology Project (2016 - 2016)



Project Introduction

Masten Space Systems proposes a Phase I SBIR effort in support of the preliminary development of a 25,000 lbf additively manufactured (AM), aluminum alloy, liquid oxygen (LOX)/methane engine for in-space propulsion. The use of AM processes have the potential to realize transformative mass, cost, and schedule savings over current state of the art in the 25,000 lbf thrust class that will enable human and robotic missions to Mars and beyond. The proposed effort will utilize Masten's experience in engine design and fabrication as well its experience with AM processes. Masten has prior experience in the use of additive manufacturing for high thrust engine hardware and will build on this heritage for the in-space propulsion application proposed in this Phase I effort. Specifically, the proposed AM engine design approach employs innovative regenerative cooling channel geometries that leverage the design freedom of AM to maintain adequate chamber cooling.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Masten Space Systems, Inc	Lead Organization	Industry	Mojave, California
● Marshall Space Flight Center (MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama



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Primary U.S. Work Locations

Alabama

California

Project Transitions



June 2016: Project Start



December 2016: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139763>)

Images



Briefing Chart Image

Additive Manufacturing Technology for a 25,000 lbf LOX/Methane Mars Ascent Engine, Phase I
(<https://techport.nasa.gov/image/135406>)



Final Summary Chart Image

Additive Manufacturing Technology for a 25,000 lbf LOX/Methane Mars Ascent Engine, Phase I Project
Image
(<https://techport.nasa.gov/image/128181>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Masten Space Systems, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

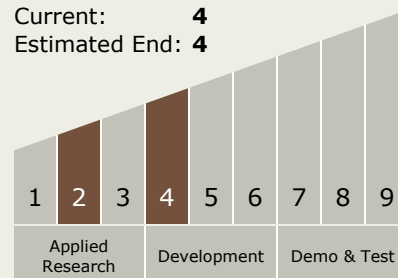
Carlos Torrez

Principal Investigator:

Jake Teufert

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.3 Cryogenic

Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars